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March 8, 2004

The Commissioner of Patents and Trademarks

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.

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Bruce Lehman

Commissioner of Patents and Trademarks

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The
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United States Patent [19]

Park et al.

[11] **Patent Number:** **5,696,375**

[45] **Date of Patent:** **Dec. 9, 1997**

[54] **MULTIDEFLECTOR**

[75] Inventors: **Melvin Park**, Nashua, N.H.; **Claus Köster**, Lilienthal, Germany

[73] Assignee: **Bruker Analytical Instruments, Inc.**, Billerica, Mass.

[21] Appl. No.: **560,396**

[22] Filed: **Nov. 17, 1995**

[51] Int. Cl.^{6} **H01J 49/40**; **H01J 49/28**

[52] U.S. Cl. **250/287**; 250/294

[58] Field of Search 250/287, 294

[56] **References Cited**

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Primary Examiner—Jack I. Berman
Attorney, Agent, or Firm—Ward & Olivo

[57]   **ABSTRACT**

A method and apparatus to direct ions away from their otherwise intended or parallel course. Deflectors are used to establish electric fields in regions through which ions are to pass. With such electric fields, ions may be deflected to a desired trajectory. According to the present invention, a multideflector, in the form of a series of bipolar plates spaced evenly across the ion beam path, is used as an ion deflector.

22 Claims, 14 Drawing Sheets